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(58) Field of search
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VFC
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(54) An air filtering apparatus

(57) An air filtering apparatus comprises a housing 4a, 4b enclosing an air-permeable filter 5, an ultraviolet radiation chamber 6 and a blower 7 for drawing air through the filter and chamber. The filter 5 removes micro-organisms and dust particles from the air. Ultraviolet radiators 6a irradiate the air to kill micro-organisms therein. Surfaces within the chamber may be aluminium or coated with aluminium paint for reflecting the radiation, thereby enhancing its effectiveness. The two halves of the housing are hinged together and the radiators automatically switch off if the housing is opened.

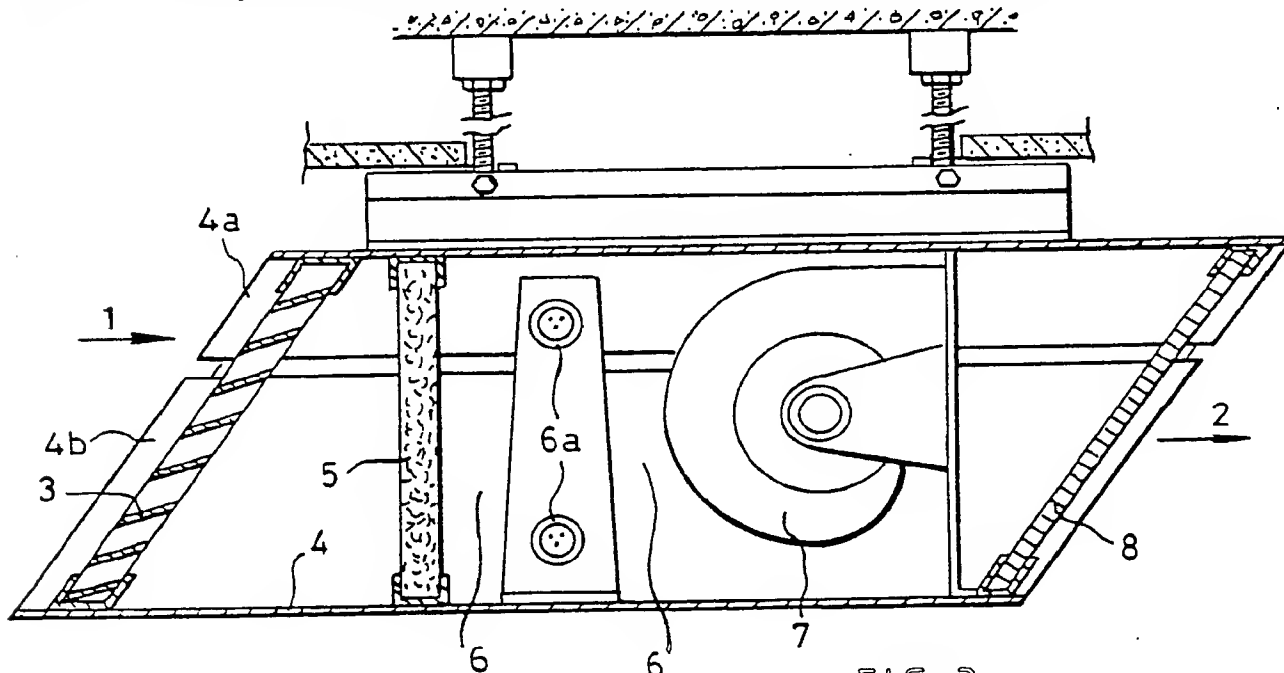


FIG. 3.

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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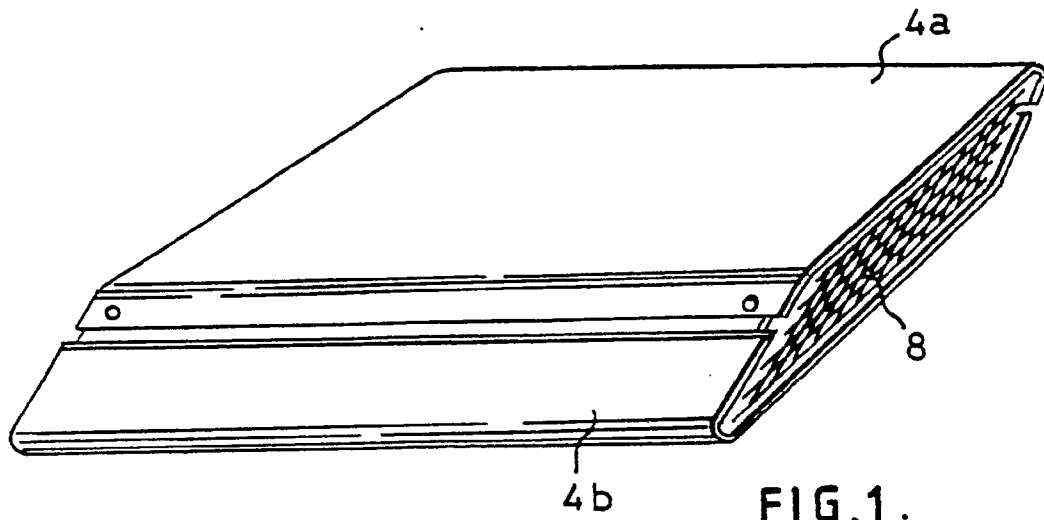


FIG.1.

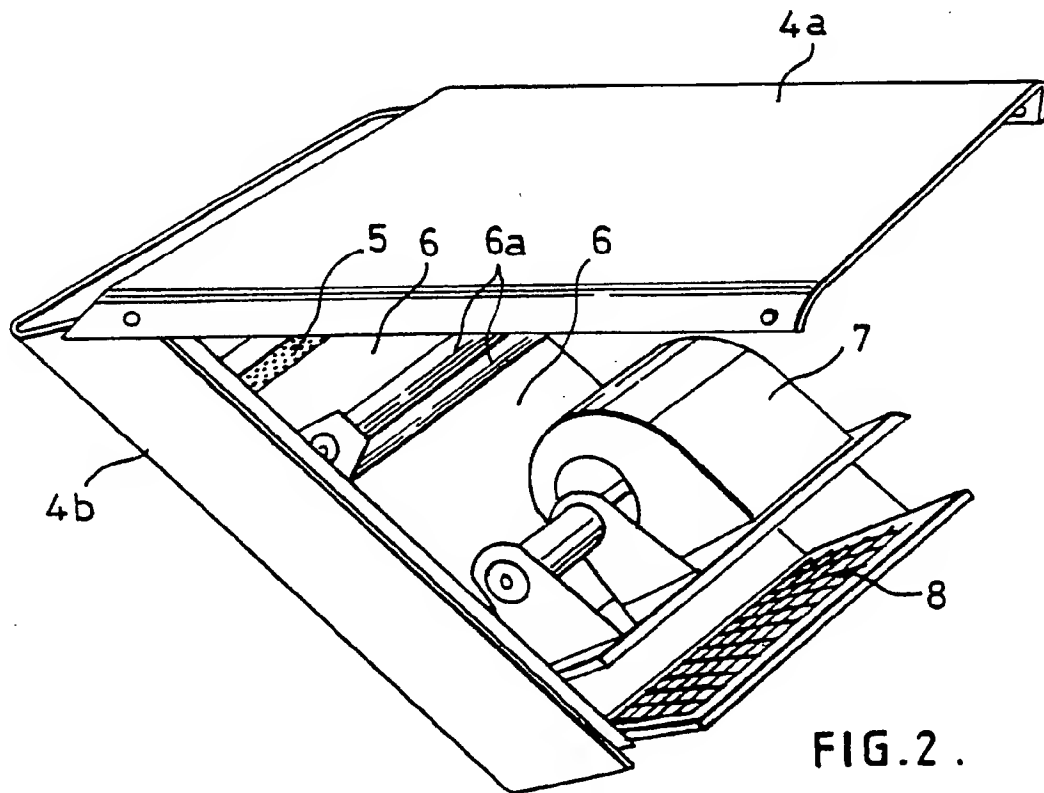


FIG.2.

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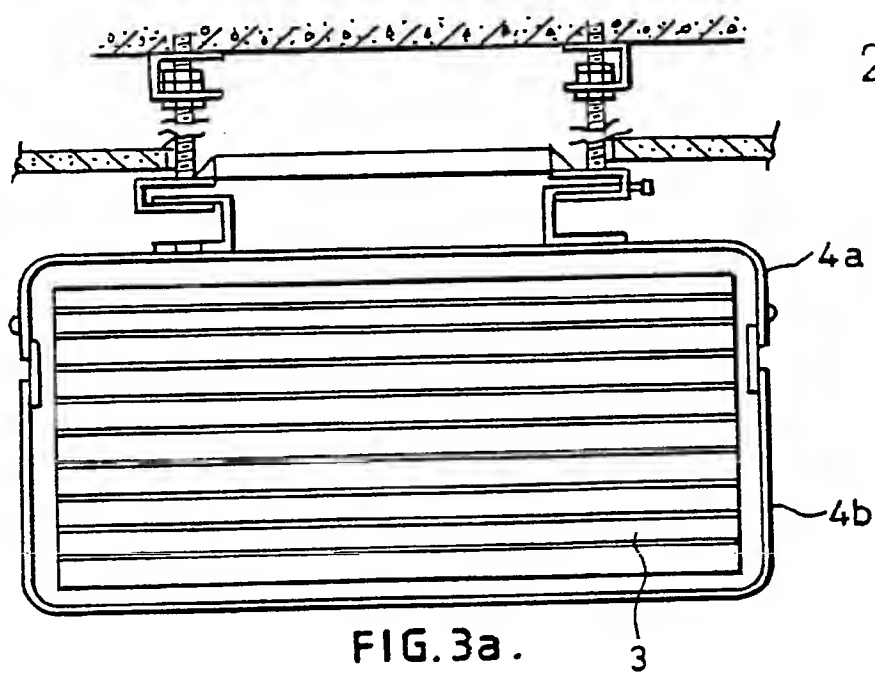


FIG. 3a.

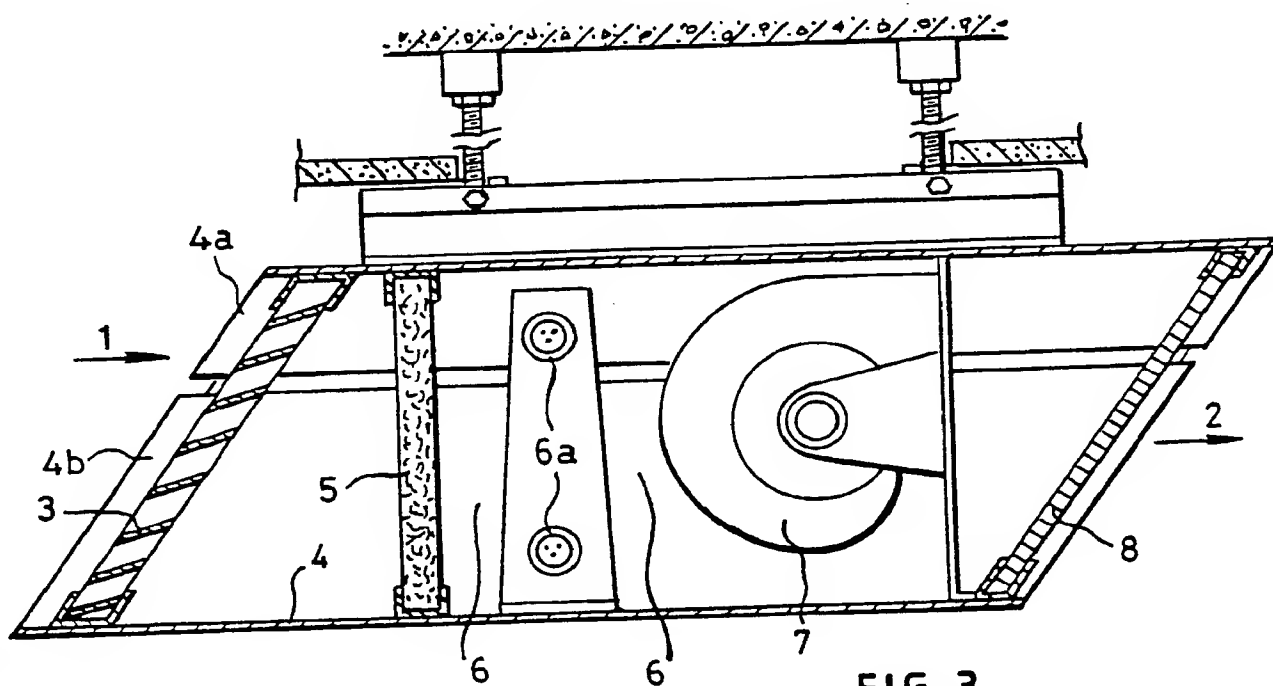


FIG. 3.

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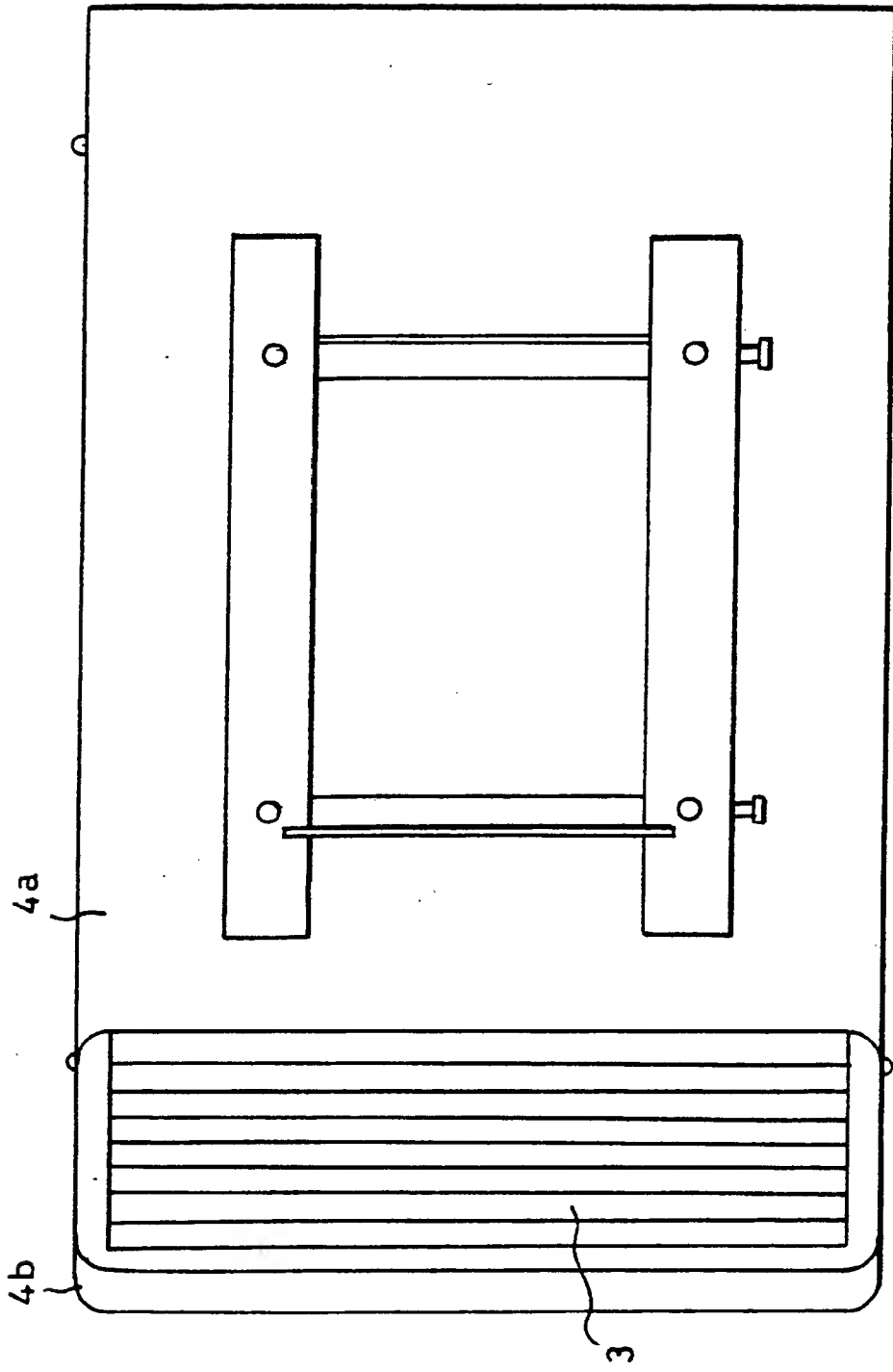


FIG. 3b

AN AIR FILTERING APPARATUS

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This invention relates to an air filtering apparatus for removing bacteria from air in a space that is unairconditioned or airconditioned by cooling, heating or mechanization ventilation system.

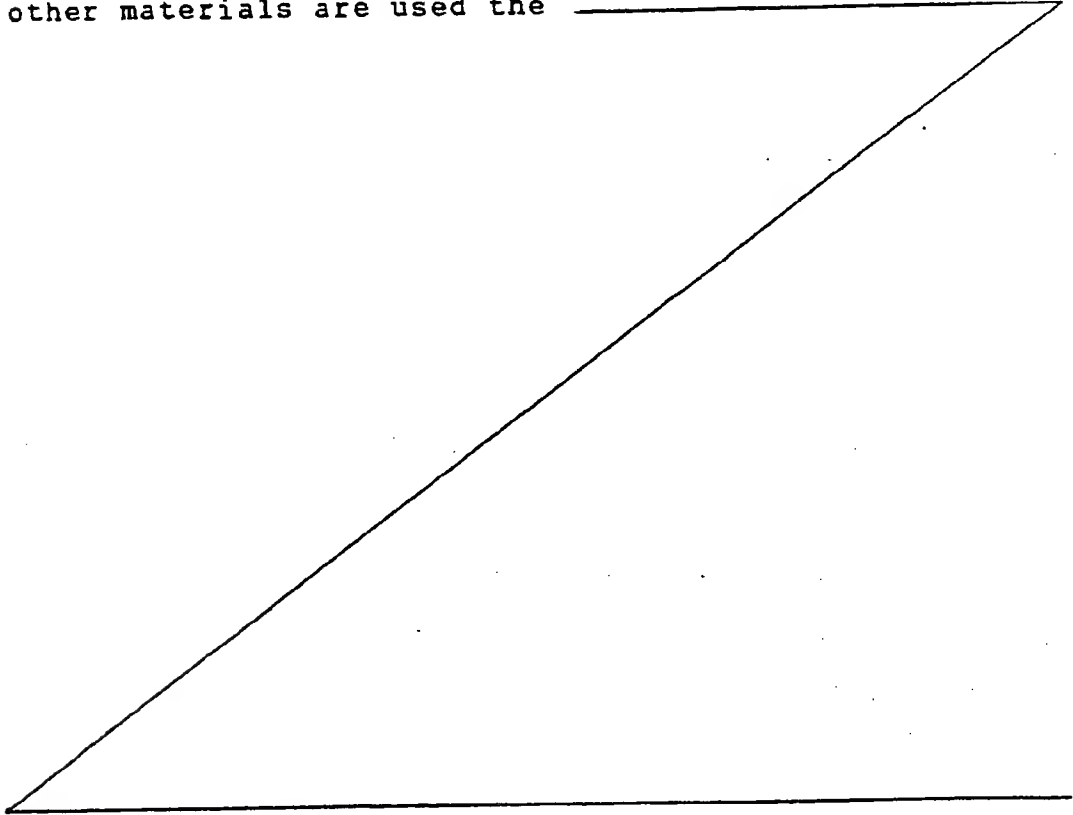
It is an aim of this invention to provide an air filtering apparatus which is suitable for use in operating theatres, pharmaceutical production areas, food processing areas, supermarkets, clinics, dispensaries, food outlets, food storage areas, offices, public areas such as crowded meeting rooms, toilets, etc., and generally in rooms where there is a requirement for low contents of micro-organisms such as bacteria moulds, yeasts and viruses.

According to the present invention, there is provided an air filtering apparatus comprising a housing for an air-permeable material arranged for filtering micro-organisms and dust particles contained in air passing therethrough, and means for irradiating the air containing micro-organisms with ultraviolet radiation so as to kill at least some of the micro-organisms.

Embodiments of this invention may comprise a housing, a filter which is of air-permeable material and is configured for filtering micro-organisms and dust particles from the air, an ultraviolet radiator of 253.7

nanometer (nm) wavelength which is arranged for emitting ultraviolet radiation towards the inner surface of the filter and surrounding chamber, and a blower to draw in air through the filter and ultraviolet radiation chamber. This apparatus will hereinafter be referred to as "an apparatus as set forth hereinbefore".

By means of the design of this invention, it is possibly unlikely that micro-organisms be present in the air leaving the apparatus. This is because of the filtering process of the filter and mainly because of the irradiation by the ultraviolet radiators within an enclosed chamber, made of aluminium material and where other materials are used the



internal surfaces of the housing where the ultraviolet radiators are positioned, are painted with aluminium paint. Both aluminium and aluminium paint provides a high degree of reflectivity, hence increasing the intensity of ultraviolet radiation in this chamber. Thus, all micro-organisms which may possibly be present thereon, are destroyed.

The ultraviolet radiators consist of at least two radiators mounted opposite each other but with its axis parallel to each other. With this arrangement, the two ultraviolet radiators which are closed enough to each other, can ensure that a radiation dose required for killing micro-organisms is provided for the airstream that flows through the filter must pass through the ultraviolet chamber within close proximity to the ultraviolet radiators and as such, would receive the lethal dose of radiation to kill any micro-organisms present.

The box housing comprising the apparatus is designed for ceiling suspended mounting where air is drawn in to the apparatus and purified air is thrown back to the room space from the ceiling mounted apparatus.

In order that the invention may be clearly understood and readily carried into effect, reference will now be made, by way of example, to the accompanying drawing, wherein:-

Figure 1 shows an isometric view of the apparatus as set forth hereinbefore, and

Figure 2 shows an isometric view of the apparatus with its bottom half opened hence exposing the filter, ultraviolet radiators and blowers shown within, and

Figure 3 shows a horizontal section along its longitudinal axis of the apparatus of Figure 1, and Figure 3a shows the front face of the apparatus, and Figure 3b shows the plan view of the apparatus.

Referring to the drawings, a flow of air (1) to be purified enters the apparatus and the purified air flow (2) leaves the apparatus and re-enters into the room space. The apparatus is basically a metal box housing (4) constructed with an upper half (4a) and a lower half (4b). Both upper and lower halves are hinged at one end and clip-locked at the other end. Releasing the clip-locked button when opening the box housing (4) would automatically switch off the power supply required to provide electricity to operate the ultraviolet radiators (b), control circuitry and blower (7). Air is drawn through the air inlet grille (3) installed at the front entry to the box housing (4). The inlet grille vanes (3) are slanted downwards such that air is drawn into the box housing (4) at an angle from a space below the box housing (4). An air filter (5) is slotted into place after the inlet grille (3) within the box housing (4). The air filter (5) can be easily removed for cleaning or replacement. The type and thickness of air filter (5) used depends on the level of filtration required and the static pressure head to minimise pressure drop through the filter.

Within the box housing (4) downstream after the air filter (5) is the ultraviolet radiation chamber (6). Two elongated ultraviolet radiators (6a) are installed with its axis parallel to each other and within close distance of each other. The wall surfaces within the ultraviolet radiation chamber (6)

is made of aluminium or is painted with aluminium paint.

Further downstream in the direction of air flow is the blower (7) which is the prime mover to cause air to be drawn at the inlet grille (3) and exhaust air at outlet grille (8). Air exhausted at outlet (2) is purified as micro-organisms are destroyed in the process of entering and leaving the ultraviolet radiation chamber (6).

CLAIMS

1. An air filtering apparatus comprising a housing for an air-permeable material arranged for filtering micro-organisms and dust particles contained in air passing therethrough, and means for irradiating the air containing micro-organisms with ultraviolet radiation so as to kill at least some of the micro-organisms.
2. An air filtering apparatus according to claim 1, wherein at least some of surfaces within the housing consist of, or are provided with a reflective material for reflecting the ultraviolet radiation within the housing, thereby enhancing effectiveness of the radiation.
3. An air filtering apparatus according to claim 2, wherein the reflective material comprises an aluminium paint.
4. An air filtering apparatus, comprising a filter which is of air-permeable material of a character to filter micro-organisms and dust particles from the air and through an ultraviolet radiation chamber with ultraviolet radiators so arranged and coated with aluminium paint to achieve maximum kill on micro-organisms.

5. An apparatus as claimed in claim 4 wherein the said apparatus is mounted on a bracket which is suspended from the ceiling.

6. An apparatus as claimed in claim 4 or 5 wherein the said apparatus has an upper and lower half box housing connected by means of hinges at one end of clip-locked at the other end so as to facilitate easy opening for checking and maintenance purposes and where for safety purposes, the ultraviolet radiators and blower will not function whenever the box housing is opened.

7. An apparatus as claimed in any preceding claim, and further comprising a blower to cause the said air to pass through the said inlet grille the said ultraviolet radiation chamber, the said blower and the outlet egg crate grille.

8. An air filtering apparatus substantially as hereinbefore described with reference to figures 1 to 3, 3a and 3b of the accompanying drawings.

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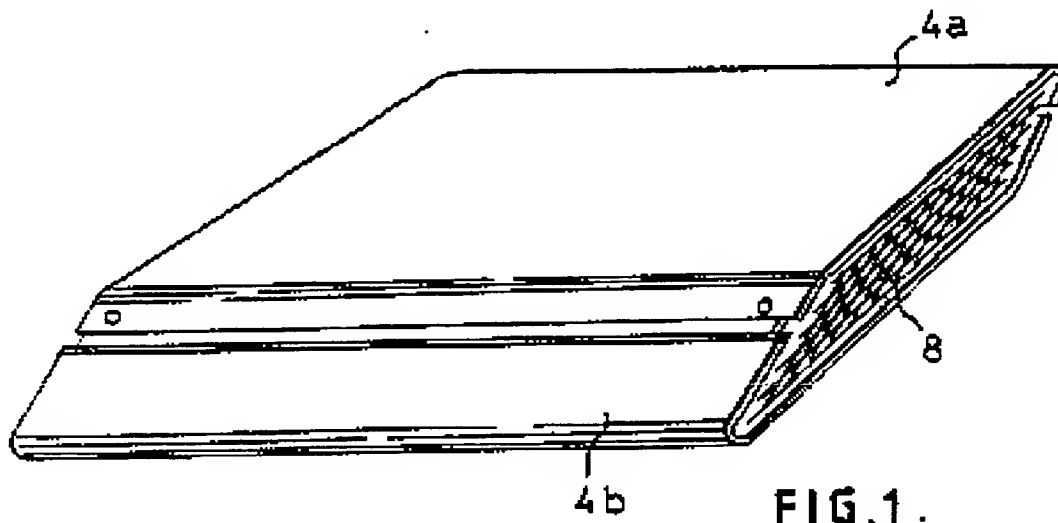


FIG. 1.

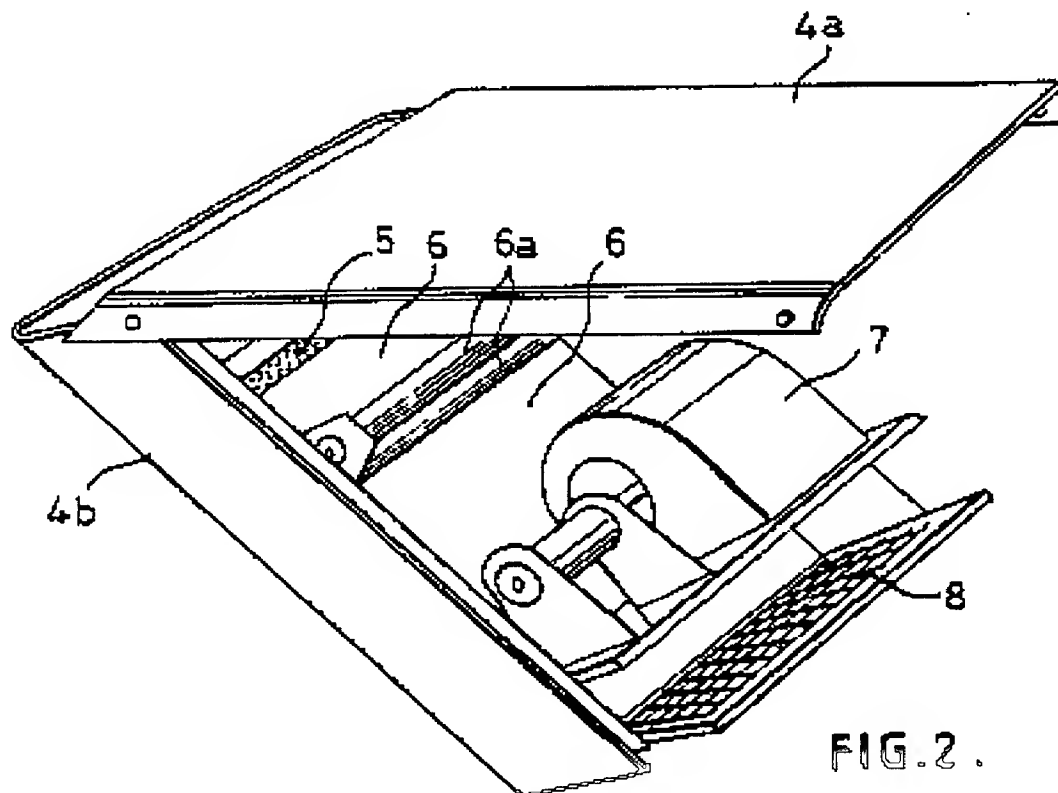
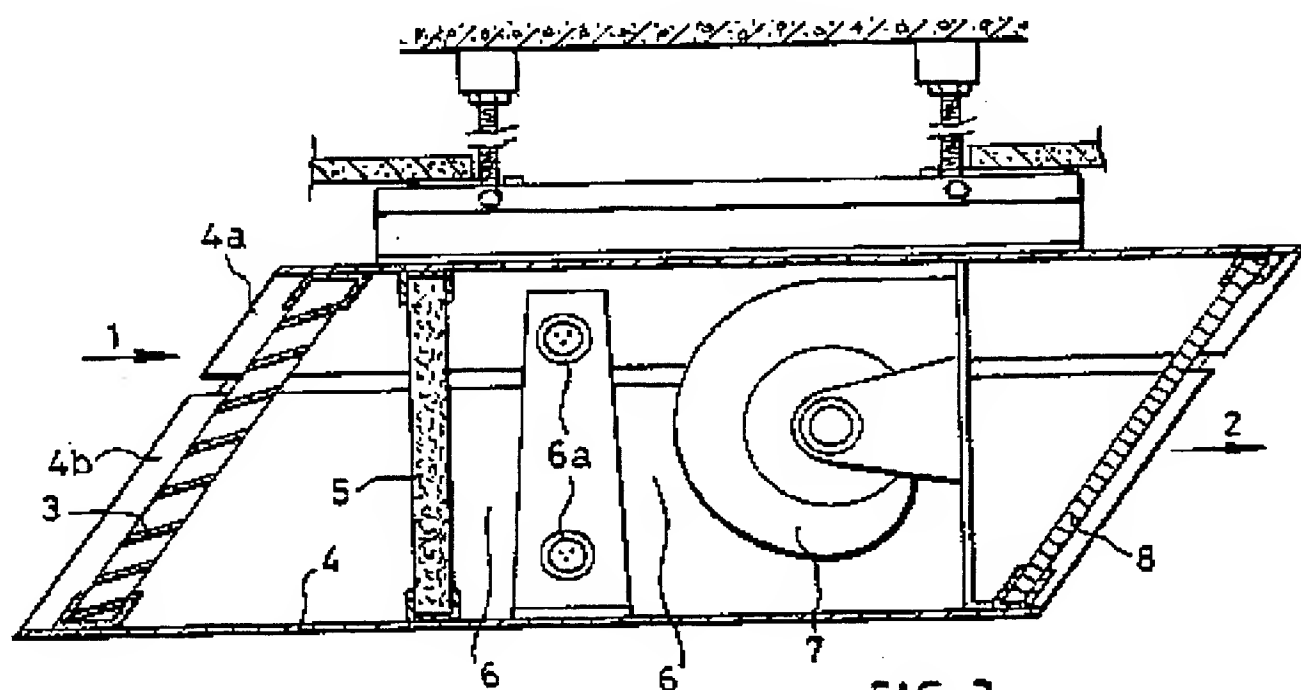
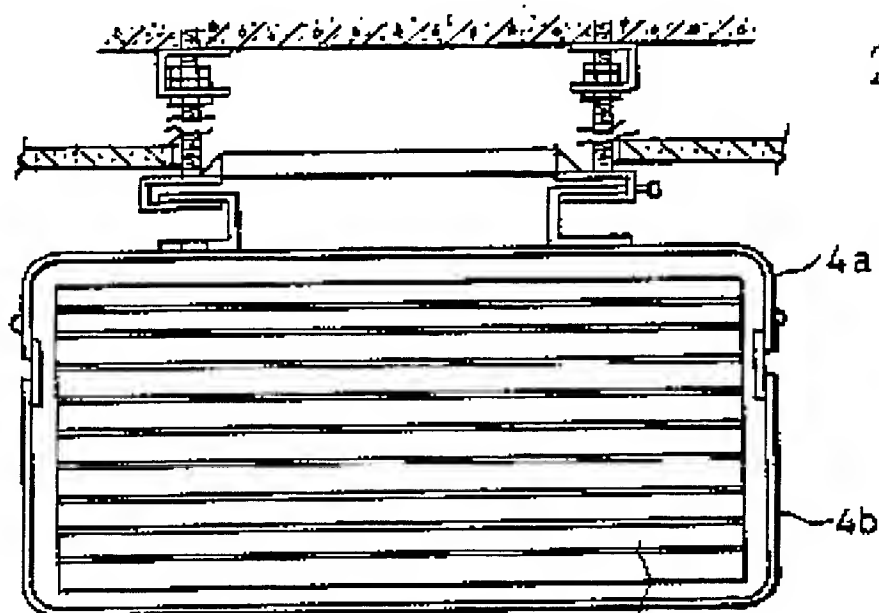


FIG. 2.

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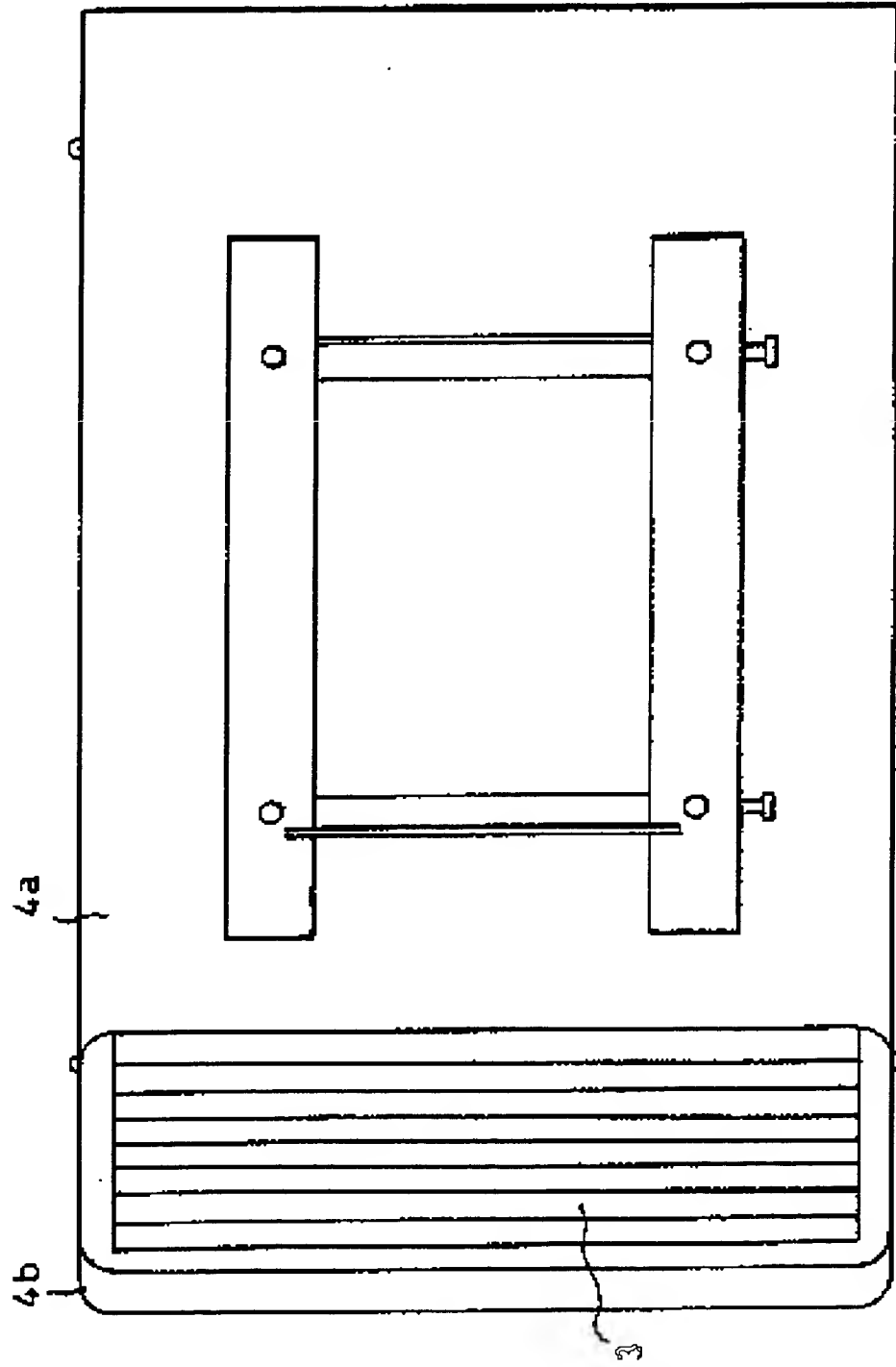


FIG. 3b

